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בקשה לפטנט
Application for Patent

לשימוש הלשכה
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אני, (שם המבקש, מענו – ולגבי גוף מאוגד – מקום התאגדותו)
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בעל אמצאה מכח Owner, by virtue of

שמה הוא of an invention, the title of which is

המצאה
Invention

(בעברית) (Hebrew) מסכת מילוט

(באנגלית) (English) Emergency Escape Mask

מבקש בזאת כי ינתן לי עליה פטנט hereby apply for a patent to be granted to me in respect thereof.

* דרישת דין קדימה Priority Claim			* בקשת פטנט מוסף – Application for Patent Addition	* בקשת חלוקה – Application of Division
מדינת האגוד Convention Country	תאריך Date	מספר/סימן Number/Mark	* לבקשה/לפטנט to Patent/Appl.	מבקשת פטנט from Application
			מס' No.	מס' No.
			מיום dated	מיום dated

* יפוי כח: כללי/מיוחד – רצוף בזה / עוד יוגש
P.O.A.: general / individual – attached / to be filed later –

הוגש בענין filed in case

המען למסירת הודעות ומסמכים בישראל
Address for Service in Israel
מיכאל פורת, רח' המתנדב 52
אפקה, תל-אביב 69690

חתימת המבקש
Signature of Applicant

היום This 01 בחודש of אוקטובר שנת 2002 of the year
01 October 2002

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This form, impressed with the Seal of the Patent Office and indicating the number and date of filing, certifies the filing of the application, the particulars of which are set out above.

מסכת מילוט

Emergency Escape Mask

Background of the invention.

The purpose of the invention is to offer a personal compact, foldable protective face mask for use in the event of the presence of unidentified contaminants such as smoke, unidentified particles or microorganisms in the atmosphere that may endanger normal breathing.

Dangerous contaminants may be smoke or fume, chemical substances, and dangerous microorganisms in the form of bacteria or germs.

There is an important need to improve civilian emergency medical response to chemical and biological terrorist incidents. Therefore, the size of the mask in its packed state, should be such that when packed, it can be carried in the pocket or handbag like a handkerchief, to be taken out and used in an emergency.

Present situation.

Masks containing permanent or replaceable filters exist on the market. Detailed information regarding the masks can be found in the European Standards for Respiratory Protective Devices (EN-132-1991 to EN-141). These are used as protection against particles, smoke, chemical substances, dangerous microorganisms or germs. The disadvantage of these masks is their size, and in most cases they are bubble shaped (2.2.1.2 in EN-134:1990) and fit over the face, and are not portable in a pocket or handbag, but must be carried in a specially designed box/bag. Flat foldable masks are not impenetrable and air enters not only via the filter,

but also via the space between the mask and the face/skin, particularly in the region of the nose. Some of the existing flat masks are manufactured to protect against some dangerous elements, but are unsuitable for protection against chemicals or microorganisms. The efficiency of most facemasks is significantly reduced when fitted over beards or irregularly shaped or sized faces. If the mask does not properly cover the face, air can penetrate via openings or gaps other than those allowed for by the filters.

Inhaling & exhaling via the filters is difficult – and these masks are therefore produced for protection against specific chemicals or microorganisms.

A method exists whereby filters that are difficult to breathe through, can be improved to facilitate the easier passage of air, by the addition of a one-directional valve for the exhalation of air from the lungs (hereinafter: "Exhalation valve"). The existing exhalation valves are rigid and enlarge the size and depth of the mask, making portability bulky and uncomfortable.

Purpose of the invention.

Our invention is intended to provide a foldable mask that is adaptable to any user's face size or shape, protecting the entire head and its orifices including eyes and ears, and only allowing passage of air from outside via the filters. The mask fabric filters air inhaled through the mouth or nose, and minimizes the danger of inhalation of air contaminated by chemicals or microorganisms.

The mask prevents irritation of the eyes by smoke. In order to minimize breathing effort, the mask has an exhalation valve that facilitates exhalation through the mask, but does not allow air to enter. The mask can be kept in the pocket or in the purse ready for immediate use.

Brief description of the drawings.

Fig. I shows a frontal view of the mask.

Fig. II shows a cross section of the Exhalation valve.

Fig. III shows the top of the bag in circular shape.

Fig. IV shows the top of the bag in prism shape.

Brief description of the invention.

The mask, shaped in plastic bag form (1 in Figs. I, III or IV), is made of transparent material, impermeable to gas penetration. The mask includes a filter (2 in Figs. I, III or IV) as protection against microorganisms and/or filtration of contaminated air, and an exhalation valve (3 in Figs. I, III and IV). The mask includes means to seal the bag around the neck (4 in Fig. I).

Detailed description of the invention.

Whilst there is an understandable reluctance to pull a plastic bag over ones head due to the dangers of asphyxiation, in our invention, the transparent material used for the body of the bag/hood incorporates air filters to enable the inhalation of filtered air. Hence, the filtered 'bag' or hood will be safe to pull over the

head and cover the face. The bottom of the bag/hood extends down to the neck area, where the material will be sealed.

The bag/hood (1 in Fig. I) can be made of any transparent plastic layer like polyethylene, polypropylene, polyamide, polyester etc. Other materials for the bag can be laminates of different transparent plastic layers. It is preferred that plastics known to be barriers against penetration of gases like polyester, polyamide etc. or laminates consisting of one of these transparent plastics be used to produce the bag.

In a preferred embodiment of the mask, the bag is made from laminated films in which at least one of the outer layers of the laminate is made of heat sealable film such as polyethylene and the other layer is made of polyamide or other gas barriers. The advantage of this combination provides the ability to safely heat seal the film to the filters to prevent penetration of air through the seals. A sandwich laminate is suggested in which the outer laminates are heat seal-able and the inner layers are gas barriers like polyamide. The advantage of this laminate is that it does not crackle or make sounds compared to regular laminates that crackle when moved in wave-like movements. Another advantage is that due to its "sandwich" layers with equal laminates on either side, the bimetal effect of the laminate is avoided and it is kept firm and does not fold, crease or bend.

The rear part of the bag, the part not facing the eyes, does not have to be transparent.

On the bag wall, preferred, but not limited to the side that will face the eyes, mouth and nose, there is a filter (2 in Fig. I) or filters for filtering inhaled air entering the bag. The filters can be made from fabric, plastic, non-woven material, paper or any other material used in the manufacture of filters for gas masks. The filter/filters are adhered to the bag permitting air passage only through them. The filters can have one or more layers. The filters can act as barriers against chemicals, smoke, and particles the size of parts of microns, to prevent the passage of bacteria or germs. The filter/filters can be round or rectangular.

In a preferred method of our invention, there are several layers of filters. The first layer acts to filter larger particles as a pre-filter, and in this form, the air that passes through this layer does not contain larger particles that may unnecessarily block the next layers that are more sensitive and delicate and impenetrable to smaller particles. If this layer is not used, the sensitive and delicate filters may be blocked by larger particles, and their filtering properties may be damaged. An additional layer contains active charcoal. The active charcoal filters odors, chemicals, smoke etc. by means of its high absorbency characteristic to these substances. An additional layer filters tiny particles the size of one micron or less. A suggested additional layer is for filtering material containing an active substance against microorganisms, such as antiseptic material e.g. Chlorehexidine or Cetylpyridinium Chloride. This layer is intended to destroy microorganisms that pass through it. Practically, the positioning of the layers is not important, since each layer performs its own filtering action, but preferably the

pre-filter which serves to filter the larger particles should be placed in front of the layer that filters the smaller particles. It is possible to combine the characteristics of two layers into one layer, or even combine all the layers into one layer that contains active charcoal, resistance to tiny particles and even containing antiseptics.

In a study conducted on the suggested filter combination including the four layers it was proved that synergism of the four layers prevented the passage of 12 types of microorganisms with an efficacy rate of 99% to 100%. Using the same system for each individual layer, the passage of the microorganisms increased by 40% and only prevented the passage of 60% of the microorganisms.

A different filtering system can be adapted to match the invented mask. Instead of the inhaled suggested filter, the mask can be equipped with an easily applied "screw-on" or "bayonet" connector, either of them to be attached to a combined filter as defined in EN-132 and EN-135 of 1991. In this case, the filter can be supplied separately to be connected to the mask, or it can form an integral part of the mask. The connector can also be used to connect the mask to a fresh air supply hose as defined in EN-135-1991. The advantage of the invented mask compared to the conventional masks as described in EN-132-1991 to EN-405 is its simplicity and inexpensive construction compared to the mentioned masks in the EN standards. The "one size fits all" and the protection of the entire head with all its orifices characterize the simplicity. Even the hood mask as described in the EN-132-1991 to EN -405 is completely different and does not suggest our invented mask.

In the bag or in the inhaling filter there is at least one exhalation valve (3 in Fig. I). It is preferable for the exhalation valve to be opposite the mouth and nose, so that the exhaled air will be expelled directly from the mask without mixing with inhaled air contained in the rest of the bag. The exhalation valve is necessary since expelled air will not pass easily through the filters contained in the bag material. The exhalation valve allows the passage of air in one direction only and prevents the penetration of air via the mask from outside. The exhalation valve is a round or rectangular frame within the mask.

In a preferred embodiment of the invention, inside the round frame (6 in Fig. II) there is an elastic "umbrella" shaped dome (7 in Fig. II) with a round base. The dome is fitted to the round base of the frame (6 in Fig. II), and attached to it. The area around the base of the valve (6 in Fig II) is rigid and significantly thicker than the rest of the mask frame (3 in Figs. I, II, III and IV). This added inflexibility prevents the valve from bending or twisting during aspiration or by face movements. Elasticity of the "umbrella" is retained, but the filter base is held firmly in place, without accidental opening of the dome that would allow the entry of air. When exhaled air flows outwards via the filter, the dome (7 in Fig. II) rises, allowing air to escape. When the flow of air stops from within, the dome, due to its elasticity, returns downwards to the base, and prevents the passage of air. In this way, the dome always seals the mask and prevents entry of air, except when air flows from within the mask outwards.

The bottom of the mask/bag (5 in Figs. I, III and IV) should be secured around the neck, preventing entry of external air into the mask. There are several methods of sealing the bag/hood around the neck, but as the bag/hood is worn in cases of emergency, only speedy methods are acceptable. One of the systems is by adding to the bottom part of the bag/hood, at the center of the rear layer, two laces (4 in Fig. I) to be tied around the neck over the outer layers of the bag/hood. The laces can be elastic.

Another system is to fold the lower bottom section of the bag/hood performing a hemline all around the bottom (5 in Figs. I, III and IV). A lace or string can be threaded through this hemline. After the bag/hood is placed over the head, the laces or strings are drawn thus gathering the plastic around the neck.

Another system is to add an adhesive tape to adhere the edges of the bottom part of the bag/hood to the neck.

A preferred system for sealing the bottom edge of the bag/hood to the neck is by using a circular elastic band or bands to be supplied together with the bag/hood. After the bag/hood is placed over the head, the elastic band is expanded and pulled over the bag/hood and head and down towards the neck. The band is then released and positioned over the bottom section of the bag to seal the fabric around the neck. The band can be made of rubber. In addition to the simplicity and performance of this system, the fact that the elastic band is not connected to the bag, or does not have to be at the bottom end of the bag, allows the placement of the elastic band and enables a seal even if the bag is longer than necessary

for the particular user. In the above-described systems of closing the mask around the neck, the tying of the mask is at the base of the bag, so that if the bag is too long for the particular wearer, although the seal around the neck is achieved, there is room for accumulation of exhaled air. In the preferred system, the edges of the bag are pulled down, and the elastic band is placed several centimeters over the bottom edges of the bag reducing the mass accumulation of air compared with the other systems. The use of an elastic band, without any previous connection to the bottom of the bag, allows optimum fit of the mask over the head. Due to various head sizes, the exhalation filter is not always opposite the mouth and nose. This is not a major problem, but it is more convenient if it is opposite the mouth and nose. The round shape of the bag facilitates easy adjustment/ positioning of the filter in order that it is approximately opposite the mouth and nose by pulling the front layer of the bag upwards or downwards, as necessary. When the filter is opposite the mouth and nose, the elastic band is re-adjusted around the neck minimizing the air mass that can accumulate due to the looseness caused by surplus material around the head.

The size of the mask is about 45 centimeters long and about 36 cm wide. The top section of the mask can be circular shaped (8 in Fig. III) or prism shaped (9 in Fig. IV) to fit the shape of the head. The shape of the head at the upper section of the mask reduces the air accumulation at the upper edges of the mask if the shape is straight and does not fit the head structure.

Additional advantage of the invention, compared to rigid masks, is that while removing the bag off the head, the bag can be turned inside out, by only touching the uncontaminated surface. Once a user knows that it is safe to take off the mask, it will be removed by handling only the inside of the bag, thereby avoiding touching the possibly contaminated outer material. The end result will be that the contaminated surface will now face inwards and the bag can be safely discarded.

The mask can be folded to minimize its size to fit into a pocket. The folded mask can be vacuum sealed in an "easy open" pouch to minimize its size.

Claims: -

1. Facemask, made of transparent plastic material impermeable to gas penetration, shaped in a bag form to cover the entire head, including a filter as protection against contaminated air and an exhalation valve and means to seal the mask around the neck.

2. Mask as described in claim No. 1, in which the transparent plastic impermeable to gas penetration is made of a laminate of various plastics.

3. Mask as described in claims No. 1 and 2, in which the plastic impermeable to gas penetration is transparent only on the part that will be worn opposite the eyes, mouth and nose.

4. Mask as in Claims Nos. 1 to 3 in which the filters are capable of filtering the passage of particles, and/or microorganisms, and/or filters that contain active charcoal, and/or filters containing antiseptic properties to destroy microorganisms.

5. Mask as in Claims Nos. 1 to 4 wherein the exhalation valve is in an "umbrella" shaped valve made from elastic material, the "umbrella" wing fitted close to the base of the frame, not allowing outside air to enter inwards, but inside air causing the "umbrella" to rise allowing its escape and cessation of the exit of air causing the "umbrella" to return

to its original position and preventing entry of air from outside.

6. Mask as in claims Nos. 1 to 5 wherein the means to seal the bag around the neck is a circular elastic band.

7. Mask as in claims Nos. 1 to 5 wherein the means to seal the bag around the neck are laces connected to the bottom of the mask.

8. Mask as in the former claims folded to the size of a folded handkerchief when not in use.

9. Mask as per claims Nos. 1 to 3 in which instead of the filter it is equipped with an easily applied screw-type or a 'bayonet' connector to a combined filter as defined in EN-132 and EN-135 of 1991.

10. Mask as per claims Nos. 1 to 3 in which instead of the filter it is equipped with a connector to an outside source of air.

11. Mask as per claims Nos. 1 to 3 in which instead of the filter and the exhalation valve it is equipped with a connector to an outside source of air.

12. Facemask that while removing it off the head, the mask can be turned inside out forming a bag, so that the former contaminated surface that was facing outwards, will now face inwards.

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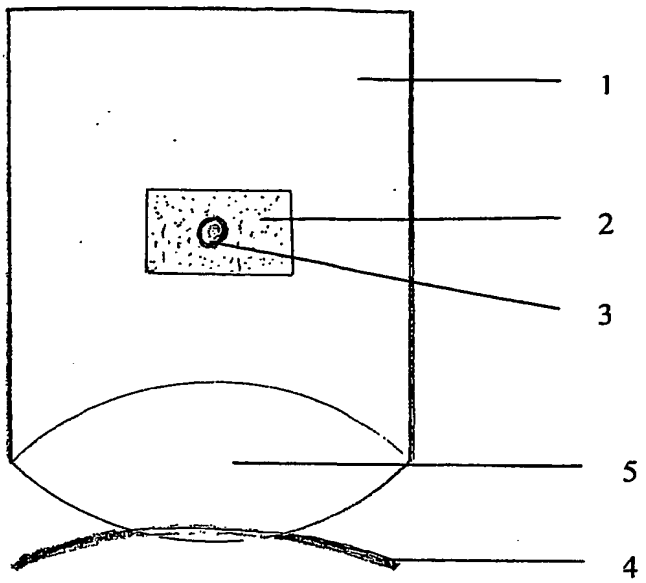

Fig. I.

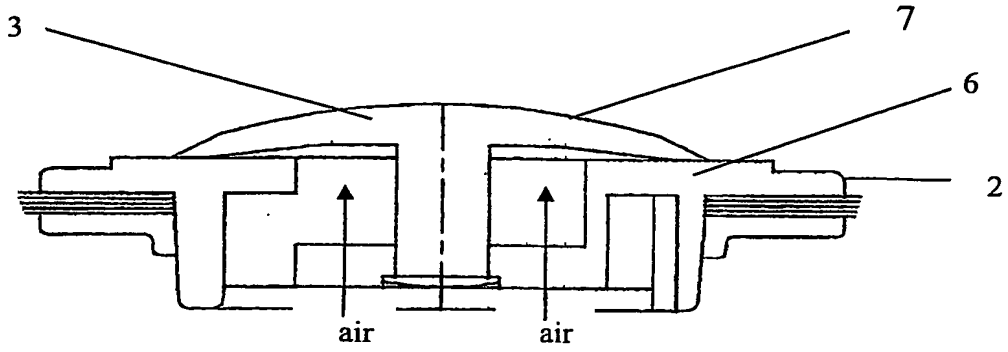

Fig. II.

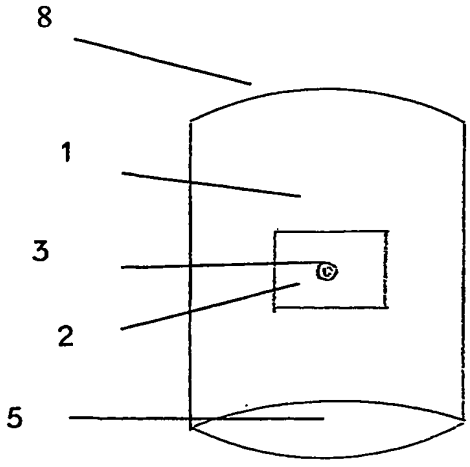

Fig. III

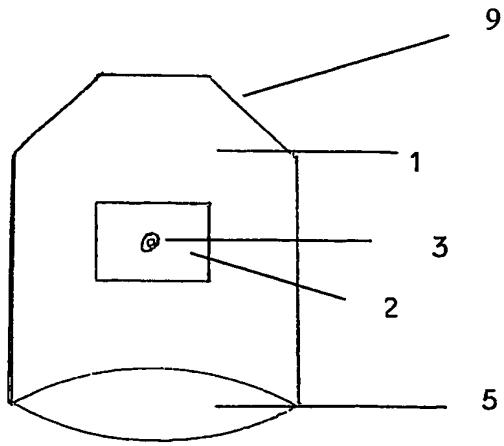

Fig. IV